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EXAMINER	
NGUYEN, LUONG TRUNG	

ART UNIT	PAPER NUMBER
2622	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/801,204	TAN ET AL.	
	Examiner	Art Unit	
	LUONG T. NGUYEN	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6-16 and 18-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-16 and 18-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The allowable of dependent claims 5 and 17 as indicated in the Final Office Action mailed on 3/18/2009, which are now canceled and the limitations of claims 5 and 17 are now incorporated into independent claims 1 and 16, respectively, are withdrawn due to the newly founded reference to Gaebele et al. (US 3,737,571). Therefore, the finality of the Office Action mailed on 3/18/2009 is withdrawn.

The Amendment filed on 4/11/2009 has been entered, a new non-final Office Action sets forth below.

Claim Objections

2. Claims 1-3, 6-16, 18-21 are objected to because of the following informalities:

Claim 1 (line 14), "said differential amplifier" should be changed to --said difference amplifier circuit--.

Claim 1 (line 16), "said dark color offset voltage" should be changed to --said offset voltage--, which refers to the limitation "an offset voltage" recited on lines 10-11 (claim 1) and is difference from the limitation "a dark color offset voltage" recited on line 17 (claim 1).

Claim 1 (line 19), "said color component" should be changed to --said one of Red, Green and Blue color component--.

Claim 1 (line 28), "said positive voltage" should be changed to --said positive input--.

Claim 1 (line 19), claim 6 (lines 1-2), claim 7 (lines 1-2), claim 8 (lines 1-2), claim 9 (line 22), claim 13 (lines 1-2), claim 14 (lines 1-2), claim 15 (lines 1-2), "said color component" should be changed to --said one of Red, Green and Blue color component--.

Claim 9 (line 1), "sensing circuit_configured" should be changed to --sensing circuit configured--.

Claim 9 (line 12), "a second voltage" should be changed to --a second output voltage--. Noted that the limitation "said second output voltage" is recited on lines 30-31 (claim 9).

Claim 9 (line 20), "said color components" should be changed to --color components--.

Claim 9 (line 22), "said differential amplifier circuit" should be changed to --said at least one differential amplifier circuit--.

Claim 9 (lines 24, 26-27), "said differential output" should be changed to --said at least one differential output--.

Since all the limitations of claim 10 have been recited in claim 9 as newly added limitations, claim 10 should be canceled.

Claim 11 (lines 9-10), "said first photocurrent" should be changed to --said first light photocurrent--.

Claim 16 (line 17), "said final output signal" should be changed to --said first final output signal--.

Claim 18 (line 4), "input_incident" should be changed to --input incident--.

Claims 1-3, 6-8 are objected s being dependent from claim 1.

Claims 10-15 are objected s being dependent from claim 9.

Claims 18-21 are objected s being dependent from claim 16.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2, 3, 11-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 (lines 6, 8, 12) recites limitation "said negative input", it is not known this limitation refers to the limitation "a negative input" as claimed in claim 1 (lines 21-22) or the limitation "a negative input" as claimed in claim 2 (line 4).

Claim 2 (line 7) recites limitation "said feedback resistor", it is not known this limitation refers to the limitation "a feedback resistor" as claimed in claim 1 (line 22) or the limitation "a feedback resistor" as claimed in claim 2 (line 5).

Claim 2 (line 11) recites limitation "said positive input", it is not known this limitation refers to the limitation "a positive input" as claimed in claim 1 (line 21) or the limitation "a positive input" as claimed in claim 2 (line 4).

Claim 3 (lines 6, 8, 12) recites limitation "said negative input", it is not known this limitation refers to the limitation "a negative input" as claimed in claim 1 (lines 21-22) or the limitation "a negative input" as claimed in claim 3 (line 4).

Claim 3 (line 7) recites limitation "said feedback resistor", it is not known this limitation refers to the limitation "a feedback resistor" as claimed in claim 1 (line 22) or the limitation "a feedback resistor" as claimed in claim 3 (line 5).

Claim 3 (line 11) recites limitation "said positive input", it is not known this limitation refers to the limitation "a positive input" as claimed in claim 1 (line 21) or the limitation "a positive input" as claimed in claim 3 (line 4).

Claim 3 (line 10) recites the limitation "said" in "said dark current". There is insufficient antecedent basis for this limitation in the claim.

Claim 11 (lines 6, 8, 12) recites limitation "said negative input", it is not known this limitation refers to the limitation "a negative input" as claimed in claim 9 (line 25) or the limitation "a negative input" as claimed in claim 11 (line 4).

Claim 11 (line 7) recites limitation "said feedback resistor", it is not known this limitation refers to the limitation "a feedback resistor" as claimed in claim 9 (line 25) or the limitation "a feedback resistor" as claimed in claim 11 (line 5).

Claim 11 (line 10) recites the limitation "said" in "said color component". There is insufficient antecedent basis for this limitation in the claim.

Claim 11 (line 11), recites limitation "said positive input", it is not known this limitation refers to the limitation "a positive input" as claimed in claim 9 (line 24) or the limitation "a positive input" as claimed in claim 11 (line 4).

Claim 12 (lines 5, 7, 11) recites limitation "said negative input", it is not known this limitation refers to the limitation "a negative input" as claimed in claim 9 (line 25) or the limitation "a negative input" as claimed in claim 12 (line 3).

Claim 12 (line 6) recites limitation "said feedback resistor", it is not known this limitation refers to the limitation "a feedback resistor" as claimed in claim 9 (line 25) or the limitation "a feedback resistor" as claimed in claim 12 (line 4).

Claim 12 (line 10) recites limitation "said positive input", it is not known this limitation refers to the limitation "a positive input" as claimed in claim 9 (line 24) or the limitation "a positive input" as claimed in claim 12 (line 3).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 6-10, 13-16, 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonoda et al. (US 5,329,111) in view of Hosier et al. (US 5,633,679) further in view of Gaebele et al. (US 3,737,571).

Regarding claim 1, Sonoda et al. discloses a color component color sensing circuit, comprising:

a color sensor circuit comprising a first photodetector configured to receive incident light falling thereon, and to provide, in response to the incident light falling thereon, a first light photocurrent therefrom as a first output voltage, the first output voltage corresponding to an intensity of one of a Red Green and Blue component of the incident light as such intensity occurs under operating temperatures (Sonoda et al. discloses output voltages corresponding to color signals R, G, B are outputted from image sensor 1 via amplifiers 2, 3, 4, and entered differential amplification circuits 8, 9,10 via resistors 8d, 9d, 10d; which occurs at a temperature of surrounding area or environment such as a room temperature, figure 7, column 1, lines 10-67);

a differential amplifier circuit (differential amplification circuit 8, figure 7, column 1, lines 10-67) operably coupled to said color sensor circuit and to said dark color sensor circuit, said differential amplifier circuit being configured to receive said first and second output voltages, remove, using said second output voltage, said dark color offset voltage from said first output voltage, and thereby provide a dark color offset voltage and current operating temperature compensated output signal to a differential output thereof representative of said intensity of said color component;

a difference amplifier (differential amplifier 8a, figure 7, column 1, lines 10-67) configured to provide said compensated output signal to said differential output and further comprising a positive input, and a negative input;

a feedback resistor (resistor 8b, figure 7, column 1, lines 47-67) having a resistor value with one end coupled to said negative input and another end coupled to said differential output;

a first resistor (resistor 8d, figure 7) having said resistor value coupled in series with a color sensor output configured to provide said first output voltage and said negative input;

a second resistor (resistor 8c, figure 7) having said resistor value coupled in series with a dark sensor output of said dark sensor circuit configured to provide said second output voltage and said positive voltage;

a third resistor (resistor 8e, figure 7) having said resistor value coupled in series to said positive input and to ground.

Sonoda et al. fails to specifically disclose a dark color sensor circuit comprising a second photodetector configured to detect and provide a dark second photocurrent proportional to said current operating temperatures and output a second output voltage corresponding to an offset voltage generated by said dark second photocurrent under current operating temperatures. However, Hosier discloses an image sensor array 10, which comprises dark photosensor 15d which establish a reset voltage or offset signal by which all of the active photosensors 15 can be calibrated (figures 1, 2, column 3, line 32 - column 4, line 29). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device Sonoda et al. by the teaching of Hosier in order to provide an image sensor array includes

dark photosensors, which are used periodically reset the offset voltage for the photosensors (column 1, lines 59-65).

Sonada et al. and Hosier et al. fail to specifically disclose said resistor value approximating a resistance of the feedback resistor in said color sensor circuit (i.e., Sonada et al. fails to disclose the resistor value of each resistor 8d, 8c, 8e is approximated the resistance of the feedback resistor 8b, figure 7). However, Gaebele et al. discloses an automatic dark current control, in which the value of resistors 60, 61, 63 and feedback resistor 65 are equal, thereby making comparator 40 a unity gain amplifier (figure 3, column 3, lines 50-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device Sonoda et al. and Hosier by the teaching of Gabele in order to provide a unity gain different amplifier for a color sensing circuit (column 3, lines 55-60).

Regarding claims 6, 13, 19, Sonoda et al. discloses wherein said color component comprises red (figures 6-7, column 1, lines 10-67).

Regarding claims 7, 14, 20, Sonoda et al. discloses wherein said color component comprises green (figures 6-7, column 1, lines 10-67).

Regarding claims 8, 15, 21, Sonoda et al. discloses wherein said color component comprises blue (figures 6-7, column 1, lines 10-67).

Regarding claims 9, 10, Sonoda et al. discloses a color sensing circuit configured to senses a plurality components of light incident thereon, comprising:

a plurality of Red, Green and Blue color sensor circuits, each color sensor circuit comprising a first photodetector and being configured to receive incident light falling thereon, and to provide, in response to the incident light falling thereon, a first light photocurrent therefrom as a first output voltage, the first output voltage corresponding to one of Red, Green and Blue color component of the incident light as such intensity occurs under current operating temperatures (voltage indicating intensity of R color signal outputted from amplifier 2 and entered differential amplification circuit 8; voltage indicating intensity of G color signal outputted from amplifier 3 and entered differential amplification circuit 9; voltage indicating intensity of B color signal outputted from amplifier 4 and entered differential amplification circuit 10; the image sensor 1 output these output voltages at a temperature of surrounding area or environment such as a room temperature, figure 7, column 1, lines 10-67);

at least one differential amplifier circuit (differential amplification circuit 8, figure 7, column 1, lines 10-67) operably coupled to said plurality of color sensor circuits and to said dark color sensor circuit and being configured to receive said first and second output voltages, remove, using said second output voltage, said dark color offset voltage from each of said first output voltages, and provide dark color offset voltage and current operating temperature compensated output signals corresponding to each of said color components to at least one differential output thereof, each of said output signals representing said intensity of said color component corresponding thereto;

a difference amplifier (differential amplifier 8a, figure 7, column 1, lines 10-67) configured to provide said compensated output signal to said differential output and further comprising a positive input, and a negative input;

a feedback resistor (resistor 8b, figure 7, column 1, lines 47-67) having a resistor value with one end coupled to said negative input and another end coupled to said differential output;

a first resistor (resistor 8d, figure 7) having said resistor value coupled in series with a color sensor output configured to provide said first output voltage and said negative input;

a second resistor (resistor 8c, figure 7) having said resistor value coupled in series with a dark sensor output of said dark sensor circuit configured to provide said second output voltage and said positive voltage;

a third resistor (resistor 8e, figure 7) having said resistor value coupled in series to said positive input and to ground.

Sonoda et al. fails to specifically disclose a dark color sensor circuit comprising a second photodetector configured to provide a dark second photocurrent proportional to said current operating temperatures and output a second output voltage corresponding to an offset voltage generated by said dark second photocurrent under current operating temperatures. However, Hosier discloses an image sensor array 10, which comprises dark photosensor 15d which establish a reset voltage or offset signal by which all of the active photosensors 15 can be calibrated (figures 1, 2, column 3, line 32 - column 4, line 29). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device Sonoda et al. by the teaching of Hosier in order to provide an image sensor array includes

dark photosensors, which are used periodically reset the offset voltage for the photosensors (column 1, lines 59-65).

Sonada et al. and Hosier et al. fail to specifically disclose said resistor value approximating a resistance of the feedback resistor in said color sensor circuit (i.e., Sonada et al. fails to disclose the resistor value of each resistor 8d, 8c, 8e is approximated the resistance of the feedback resistor 8b, figure 7). However, Gaebele et al. discloses an automatic dark current control, in which the value of resistors 60, 61, 63 and feedback resistor 65 are equal, thereby making comparator 40 a unity gain amplifier (figure 3, column 3, lines 50-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device Sonoda et al. and Hosier by the teaching of Gabele in order to provide a unity gain different amplifier for a color sensing circuit (column 3, lines 55-60).

As for claim 16, claim 16 is a method claim of apparatus claim 1. Therefore, see Examiner's comments regarding claim 1.

As for claim 18, see Examiner's comments regarding claim 9.

7. Claims 2-3, 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonoda et al. (US 5,329,111) and Hosier et al. (US 5,633,679) in view of Gaebele et al. (US 3,737,571) further in view of Nagasaki et al. (US 5,502,488) and Nelson et al. (US 5,508,507).

Regarding claims 2-3, 11-12, Sonoda et al., Hosier et al. and Gaebele et al. fail to specifically disclose a sensor circuit comprises:

a transimpedance amplifier including an output configured to provide said first output voltage, a negative input, and a positive input;

a feedback resistor with one end coupled to said output and another end coupled to said negative input;

a photodetector configured to detect said photocurrent of said color component and comprising a photodetector input coupled to ground and to said positive input, and a photodetector output coupled to said negative input.

However, Nagasaki et al. discloses a circuit of one pixel of a solid-state imaging device which comprises photodiode 8, the output of the photodiode 8 coupled to the negative input of amplifier 11, the input of the photodiode 8 coupled to ground; the positive input of amplifier 11 coupled to ground; the amplifier 11 includes a feedback resistor (figure 16, column 6, lines 39-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Sonoda et al., Hosier et al. and Gaebele et al. by the teaching of Nagasaki et al. in order to provide a current-voltage converting circuit, which assures sufficient output voltage.

Sonoda et al., Hosier et al., Gaebele et al. and Nagasaki et al. fail to specifically disclose a compensation capacitor coupled in parallel with said feedback resistor to said output and said negative input. However, Nelson et al. teaches a combination circuit 51, which includes a compensation capacitor 56, a feedback resistor 54 and operational amplifier 52 (figure 3, column

11, lines 27-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Sonoda et al., Hosier et al., Gaeble et al. and Nagasaki et al. by the teaching of Nelson et al. in order to provide a transimpedance amplifier which results in a conversion of current pulse into a corresponding voltage pulse (column 11, lines 27-36).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571) 272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David L. Ometz/
Supervisory Patent Examiner, Art Unit 2622

/L. T. N./
4/29/09